Space Weather Forecast

Issued on Thursday, 28 October 2021 at 01:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class X-ray flares. Chance of a glancing blow from a Coronal Mass Ejection on either the 30th or 31st October.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was low in the 24-hour period, with numerous Common-class flares observed. AR2891 in the northeast is likely to have been the source for several far-sided Coronal Mass Ejections (CMEs) in the past week, as observed in satellite imagery. This new region is one of five on the current facing side of the sun, with the others all appearing in the southern solar hemisphere. There is one larger and more complex region amongst these which has the potential to give larger flares. A filament eruption (arc of plasma) which was observed lifting off the southeast limb at 27/0250 UTC produced a CME, which has been analysed and is currently expected to give a glancing blow at Earth late on day 3 (30th) or early on day 4 (31st). Another filament eruption has been observed lifting off the Earth-facing disc, which appears to have originated from AR2887 at 27/2215 UTC, awaiting on imagery for any potential CME or Earth-directed component - pending analysis.

Solar Wind / Geomagnetic Activity: The solar wind speed, as measured by DSCOVR at L1, was at ambient levels at the start of the period, rising to slightly elevated levels, just above 400km/s, between 27/0240 UTC until 27/0800 UTC, before reducing back to the current slow-ambient levels. The magnetic field and the all important north-south component were weak. The result of the above solar wind measures was Quiet geomagnetic activity throughout, Kp 0-2.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Common-class flares are expected (90% risk), with a chance (40%) of Moderate-class flares. This is the result of the complexity of one of the regions in the southern hemisphere, and the previous activity of the region on the northeastern limb.

Solar Wind / Geomagnetic Activity: A filament eruption (arc of plasma) seen in imagery at 27/0250 UTC produced a CME seen lifting off the southeast limb. This has been analysed and gives a glancing blow at Earth late on the 30th or early on 31st Oct. Also, an enhancement to around 450-500 km/s is possible either later on Day 1 or early Day 2 (28-29 Oct) due to a possible coronal hole fast wind. An enhancement was seen at the STEREO-A spacecraft which would correspond with these timings. Geomagnetic activity is expected to be mainly Quiet to Unsettled, but with a chance of Active intervals should we observe any faster solar winds on Days 2 or 3. Geomagnetic activity may become enhanced further late on day 3 or early day 4 (30-31 Oct) due to glancing blow from a CME, which left the sun early on the 27th, with a chance of Unsettled to Active intervals.

Energetic Particles / Solar Radiation: No solar radiation storms are currently expected,

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although chances are raised just slightly above background due to the more complex sunspot on the disc. This may rise slightly as the region on the northeastern limb rotates further across towards the western side of the Sun.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	2	2
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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